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Vegetarian and Vegan Eating Patterns

Jamie Baum

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
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DFEND 2.0

Is a plant-based diet right for you?
Vegetarian and Vegan Eating Patterns

November 20th, 2020

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Project D-FEND: Diet, Food, Exercise, and Nutrition during social distancing. A collaboration between the University of Arkansas System Division of Agriculture's Center for Human Nutrition and the University of Arkansas Exercise is Medicine Program. The University of Arkansas System Division of Agriculture is an equal opportunity/affirmative action institution.

Image: https://www.runnersworld.com/nutrition-weight-loss/a23566499/tips-for-eating-more-plants/

Objectives

- Different types of vegetarian diets.
- Identify challenges that vegetarians may experience in meeting their requirements for specific nutrients, and provide strategies to alleviate these concerns
- Describe the rationale for protein complementation, and give two examples of complementary protein foods
- Compare and contrast the dietary recommendations and potential benefits of a vegetarian and Mediterranean diet

Source for presentation: Pope and Nizielski. *Nutrition: For a changing world, 2nd edition. 2019.*

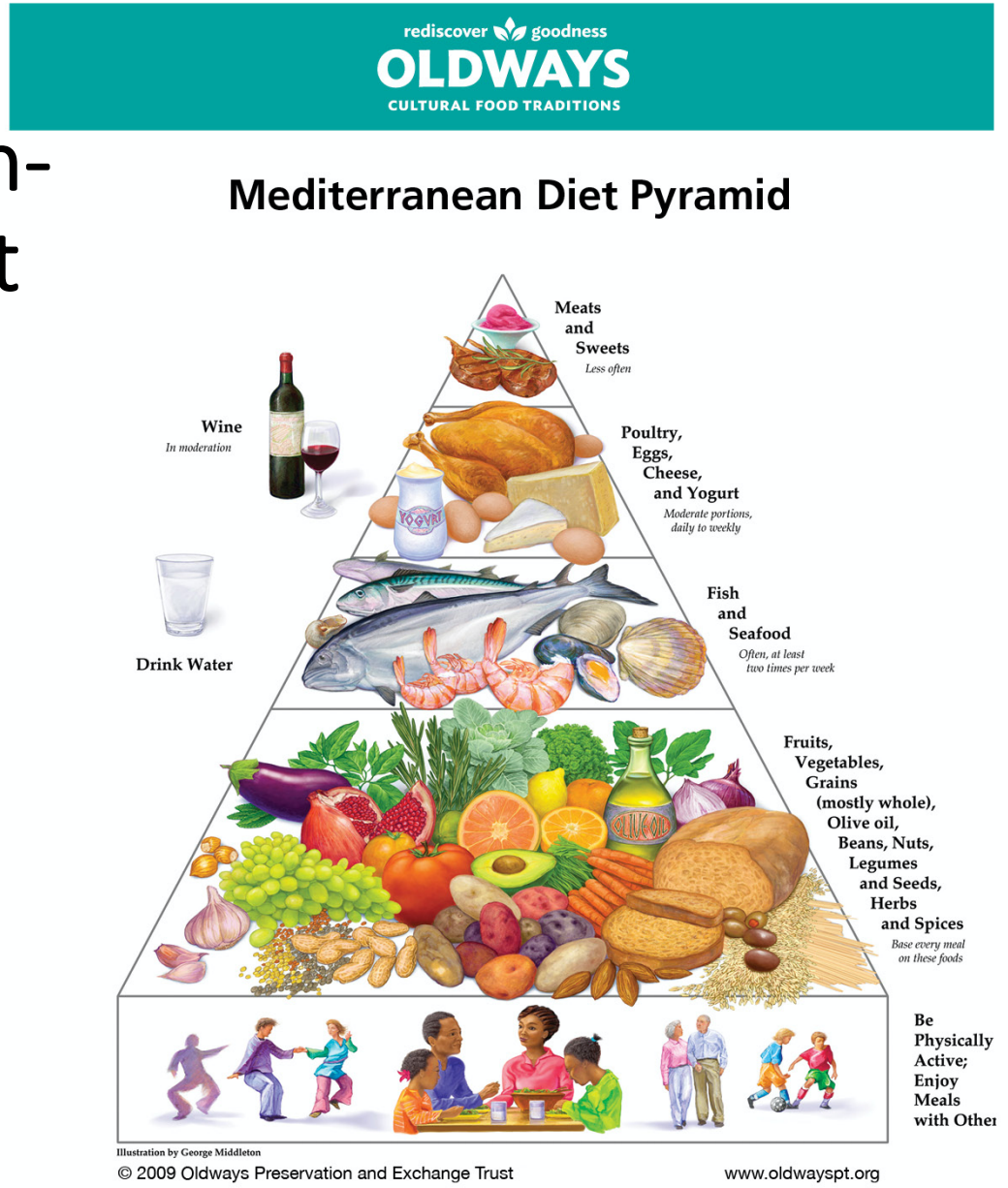
Vegetarian – Definitions

- A person who does not eat meat, and sometimes other animal products, especially for moral, religious, or health reasons.
  - Oxford Dictionary

- **4 Types of Vegetarian Practices** (MayoClinic.org)
  - **Lacto-vegetarian** diets exclude meat, fish, poultry and eggs, as well as foods that contain them. Dairy products, such as milk, cheese, yogurt and butter, are included.
  - **Ovo-vegetarian** diets exclude meat, poultry, seafood and dairy products, but allow eggs.
  - **Lacto-ovo vegetarian** diets exclude meat, fish and poultry, but allow dairy products and eggs.
  - **Pescatarian** diets exclude meat and poultry, dairy, and eggs, but allow fish.
  - **Vegan** diets exclude meat, poultry, fish, eggs and dairy products — and foods that contain these products.

Spanish researchers demonstrated significant benefits of a Mediterranean-style diet over a traditional low-fat diet

- Mediterranean diet: a plant-based diet
  - Rich in fruits, vegetables, nuts, olive oil, and whole grains
  - Low in processed and red meats, dairy products, and sweets
- Lowers heart problems and heart-related death
  - “As potent as modern drugs to reduce cardiovascular risk”



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Plant-based diets emphasize whole plant foods

- Vegetables and fruits
- Whole grains, beans, legumes, nuts and seeds
- Minimal processed foods
- Limited (or omitted) animal foods
- Mediterranean and vegetarian diets are plant-based diets

California Walnut Commission

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Studies show that plant-based diets reduce the risk of cancer

- Group of conditions that result from uncontrolled growth of abnormal cells that invade the body
- Second leading cause of death in the United States

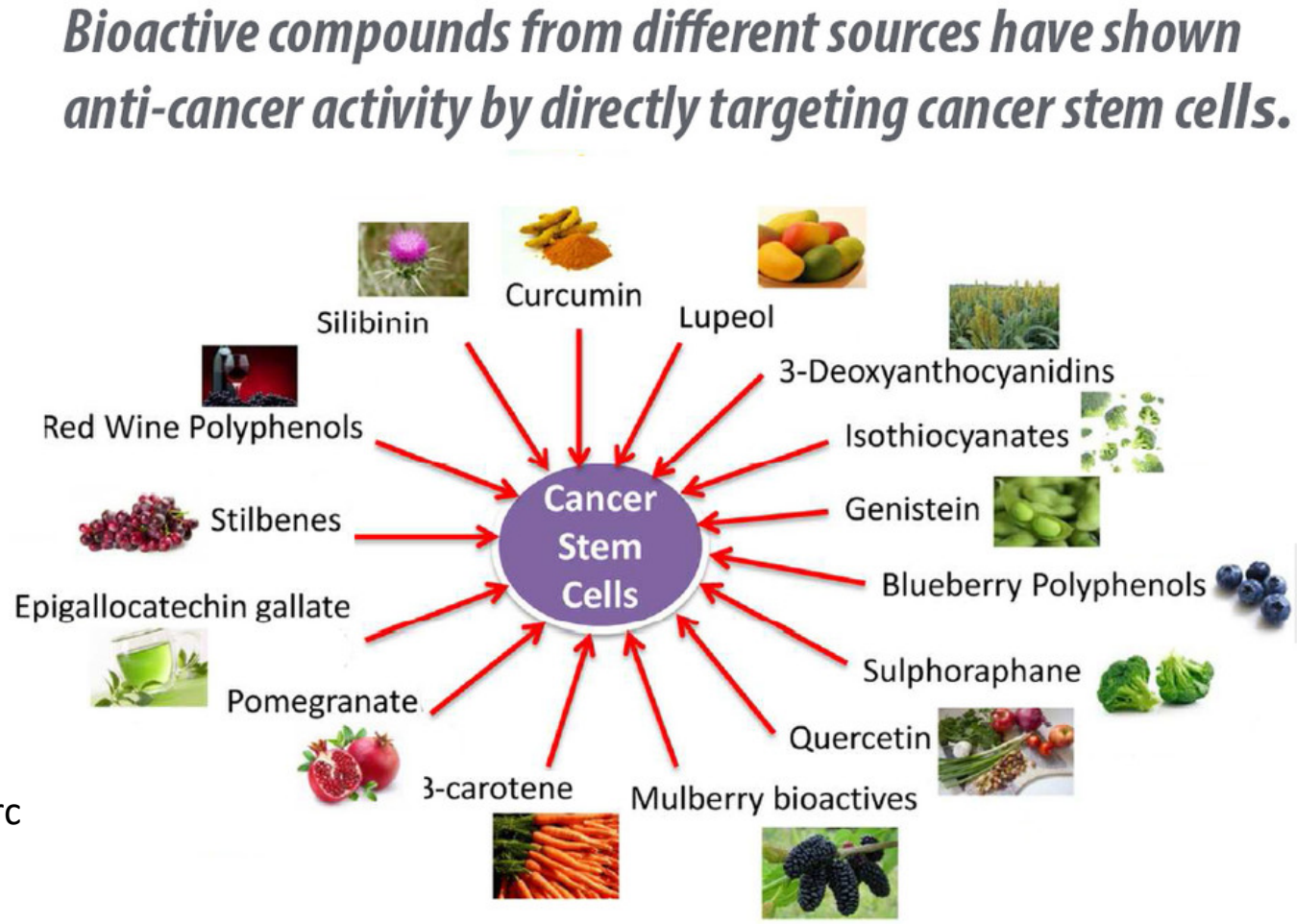

Image: https://news.psu.edu/story/393285/2016/02/18/research/fruits-vegetables-farm-fork-continuum-vital-cancer-prevention

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Phytochemicals are found in plant foods and have many health benefits

- Provide color, aroma, and flavor
  - Plant pigments are a rich source
  - “Eat a rainbow” of foods
- Health benefits
  - Antioxidant, anti-inflammatory, or hormone-like actions

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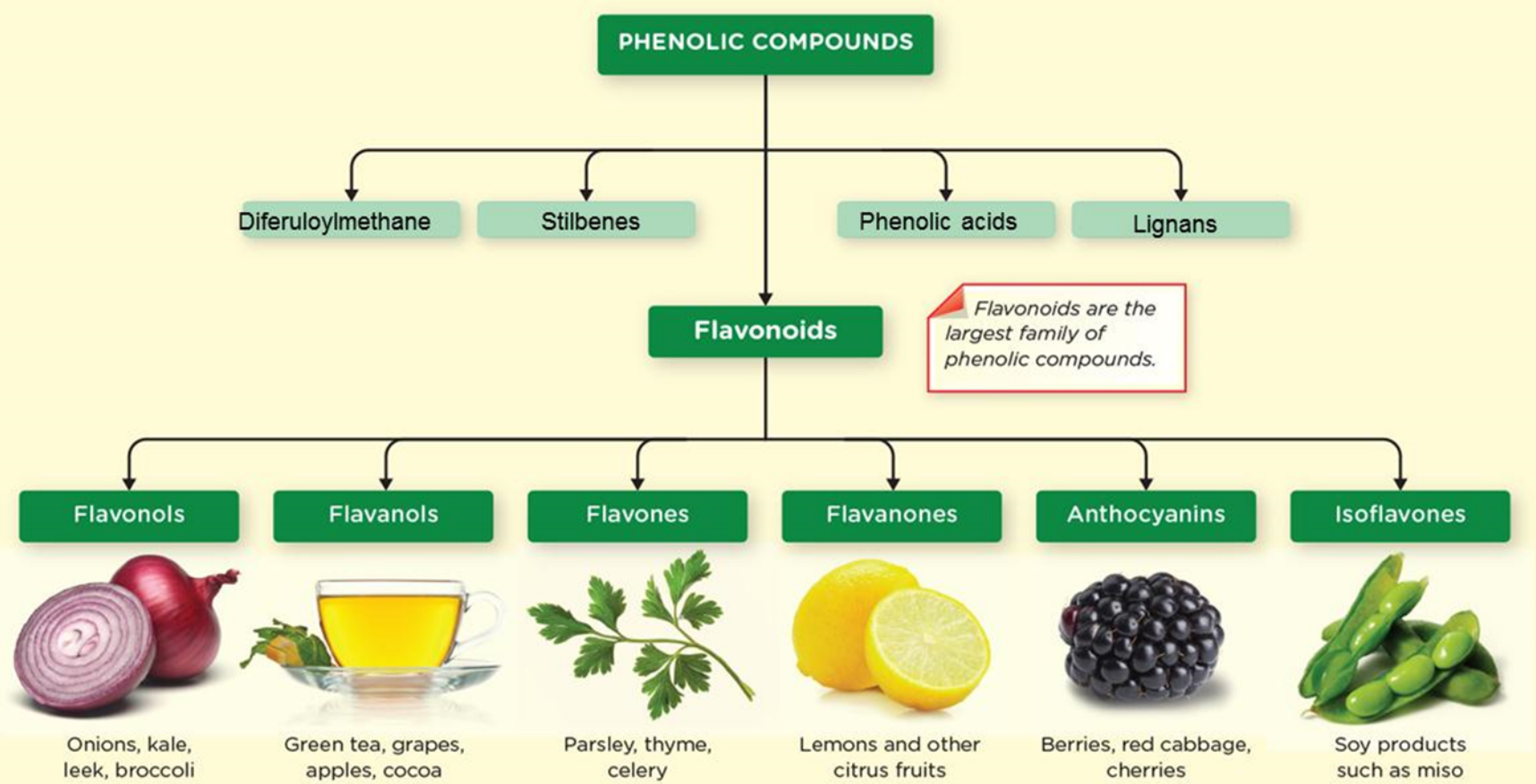
There are many types of phytochemicals

- Polyphenols
  - Most abundant and diverse in our diet
  - Anti-inflammatory effects
  - Associated with reduced risk of chronic diseases
  - May reverse, suppress, or prevent cancer
  - Include:
    - Resveratrol
      - In grapes and red wine
    - Isoflavones and lignans
      - In soy and flaxseed
      - Hormone-like effects

Image: https://blogs.oregonstate.edu/linuspaulinginstitute/2014/04/10/phytochemicals/

Diets rich in polyphenols are associated with reduced risk of chronic diseases



Pope/Nizielski, *Nutrition for a Changing World*, 2e © 2019 W. H. Freeman and Company
Photo credits (left to right): kaanates/Getty Images, dem10/Getty Images, letty17/Getty Images, benimage/Getty Images, julichka/Getty Images, kyoshino/Getty Images

Carotenoids are another type of phytochemical responsible for the yellow, orange, and red colors in plant foods

- Beta-carotene
- Lutein and zeaxanthin in spinach and kale are important to eye health
- Lycopene in tomatoes and watermelon may lower the risk of prostate and ovarian cancer

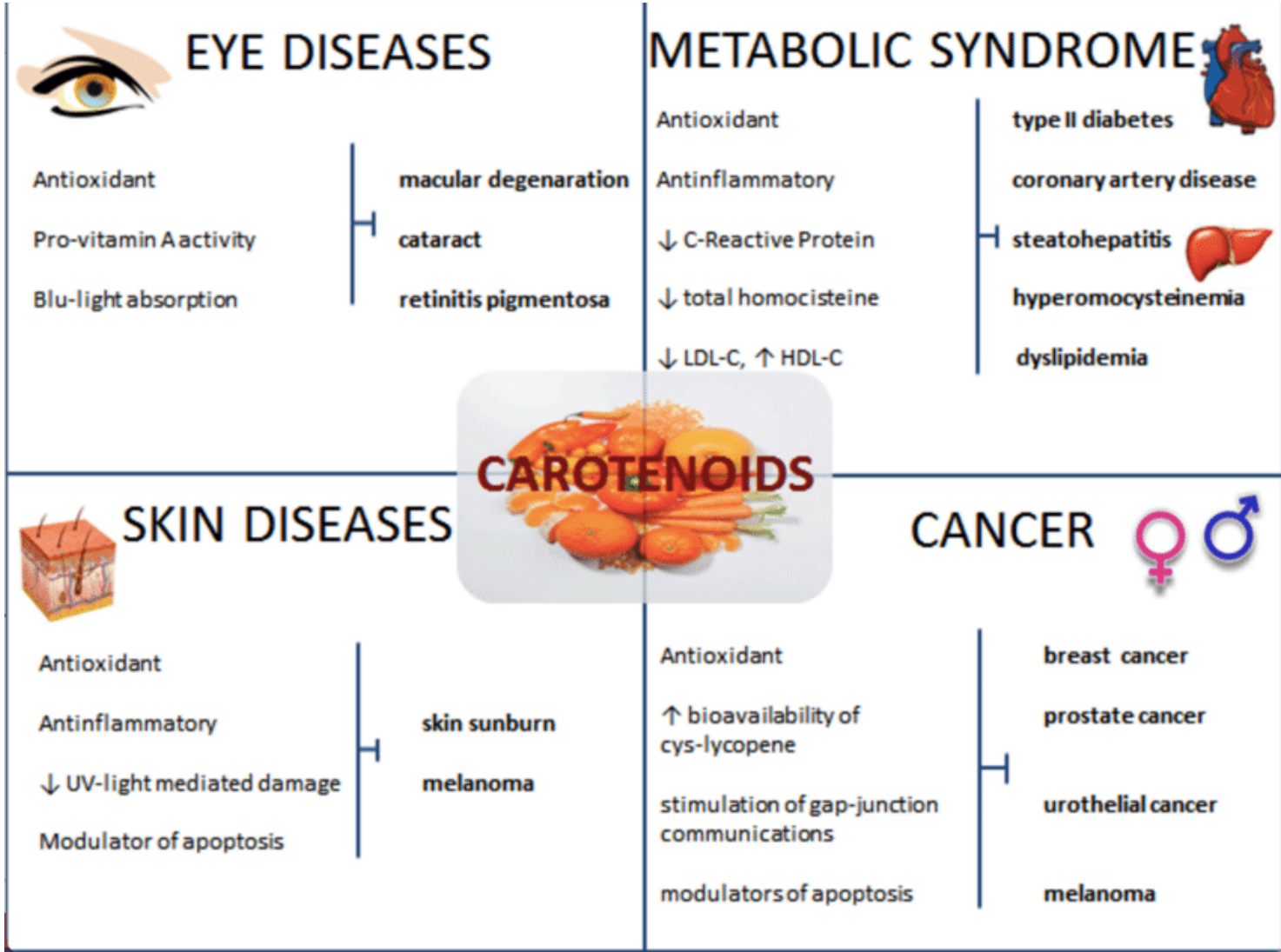
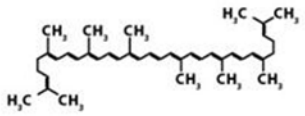
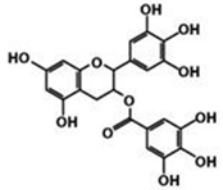
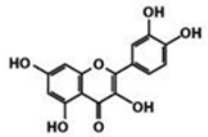
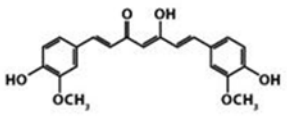
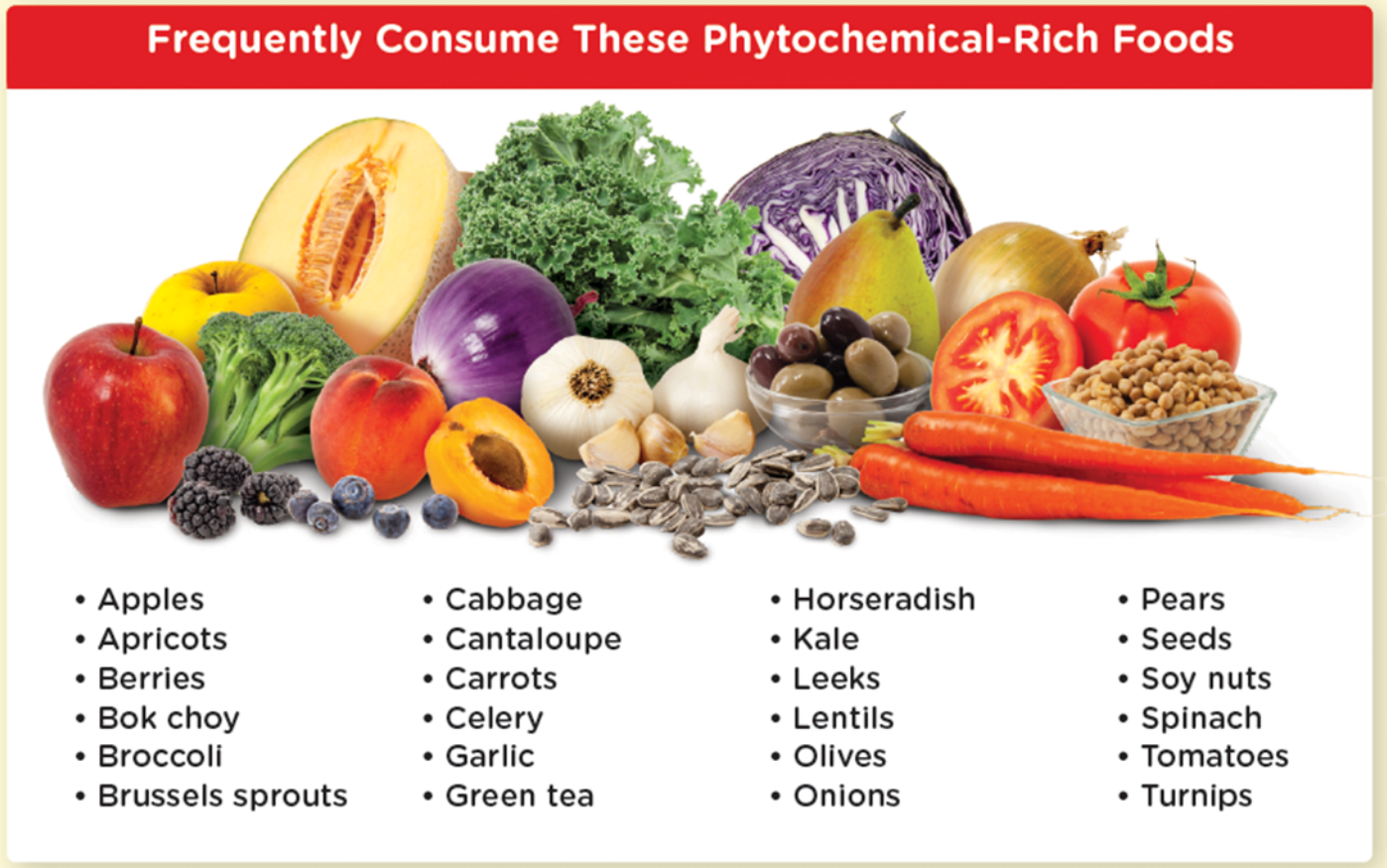


Image: https://www.researchgate.net/figure/Fig-1-Mechanism-of-action-of-carotenoids-against-chronic-diseases_fig1_313508118/download

Examples of phytochemicals, their sources, and possible benefits

Phytochemical	Lycopene	Epigallocatechin gallate (EGCG)	Quercetin	Curcumin
Class/Subclass	Carotenoid	Polyphenol Flavonoid/Flavanol	Polyphenol Flavonoid/Flavanol	Polyphenol Diferuloymethane
Structure				
Excellent Sources	 Tomatoes, watermelon, pink grapefruit	 White and green tea	 Red and yellow onions, hot yellow peppers, kale, capers, cranberries	 Turmeric spice
Possible Benefits	Diets high in lycopene may reduce the risk of developing cataracts, and prostate and ovarian cancers.	EGCG is the most abundant flovanoid in green tea. Green tea may have anti-cancer, anti-obesity, anti-atherosclerotic, and anti-diabetic effects.	Quercetin has been shown to have anti-inflammatory effects, and it may reduce the risk of heart disease and cancer.	Curcumin may have antioxidant and anti-inflammatory effects. It may also reduce the risk of cancer, and slow the progression of Alzheimer disease.

Phytochemical-Rich Foods



Pope/Nizielski, *Nutrition for a Changing World*, 2e © 2019 W. H. Freeman and Company
Photo credit: Eli Ensor

Use These Tips to Help Consume More Plant-Based Foods

- Plan to eat at least 5 portions of fruits and vegetables every day. Start with breakfast. Aim for 3 servings by lunchtime.
- Start your morning with fruit in plain yogurt, cereal, or sliced fruit on whole wheat toast.
- Add nuts to yogurt, cereal, or salads.
- Scramble your eggs with diced vegetables.
- Go for color. Prepare tomato-based soup and include a vegetable of every color.
- Add steamed vegetables or legumes to your favorite pasta.
- Add vegetables to pizza to increase nutritional punch.
- Drink black, green, or herbal teas.
- Add spices to your meals such as garlic, basil, oregano, sage, turmeric, thyme, or ginger.
- Keep frozen vegetables on hand to add to casseroles and soups and to stretch takeout stir fry and pasta dishes.
- Try soy products such as tofu and vegetable protein meat substitutes.
- Make your sandwiches more interesting with cabbage, carrots, cucumber, peppers, and a rainbow of lettuce colors and textures.

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Individuals who infrequently consume animal products may need a plan to obtain these important nutrients

- Nutrients of potential concern
  - Protein
  - Iron
  - Vitamin D
  - Riboflavin
  - Vitamin B12
  - Omega-3 fatty acids
  - Iodine

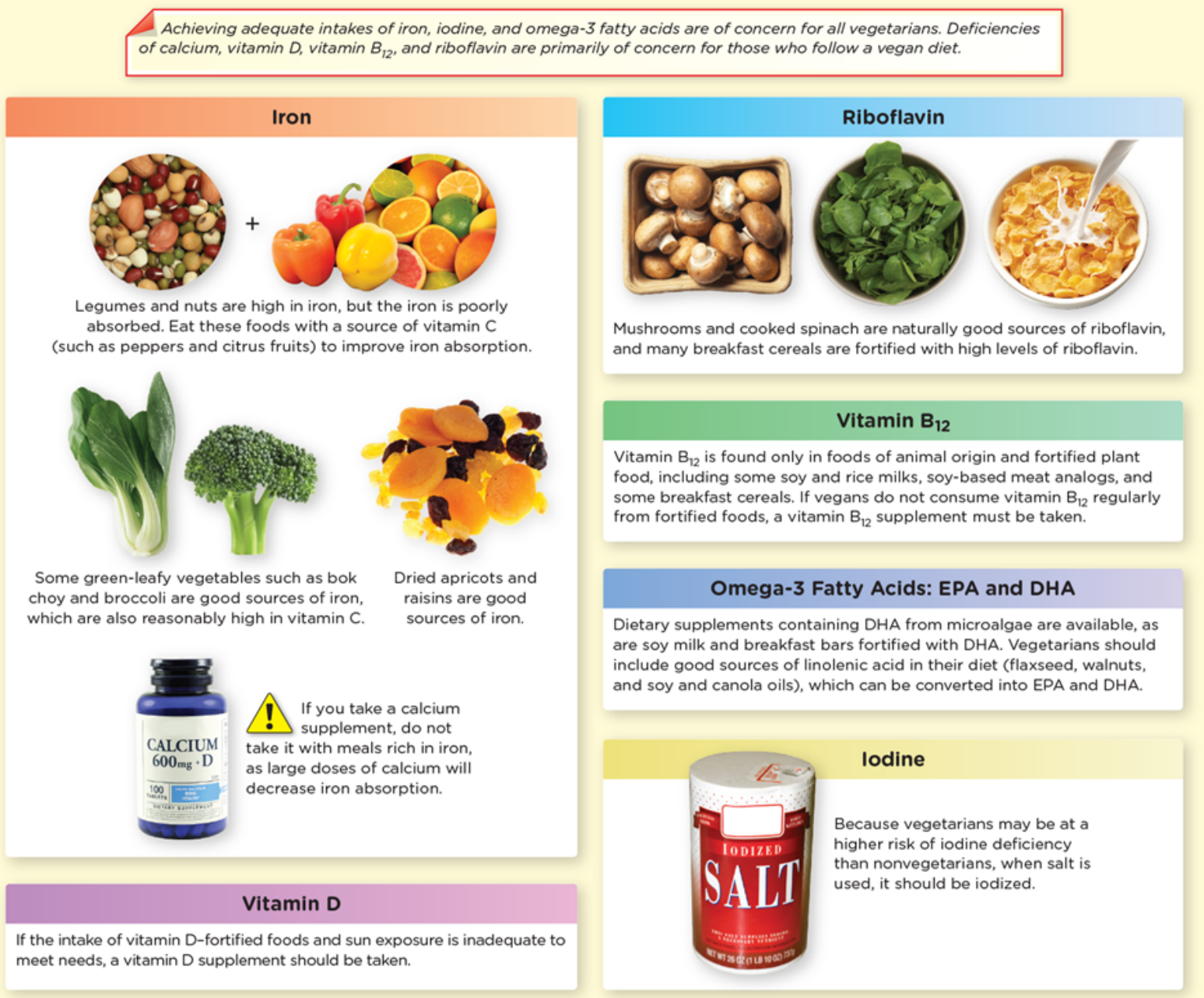

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Photo credits (iron — top left to bottom right): Jamikorn Sooktaramorn/Shutterstock, Eli Ensor, Lightspring/ Shutterstock, imagenavi/Getty Images, subjug/Getty Images, David Lee/Alamy, Donna Beeler/Shutterstock; (riboflavin — left to right): Annabelle Breakey/Getty Images, Image Source/Getty Images, ifong/Shutterstock; (iodine): Anthony Pleva/Alamy

Individuals who exclude animal foods need to consume complementary protein foods to help meet protein needs

- Complete protein
  - Provides all nine essential amino acids in amounts to support protein synthesis
  - Includes meat, dairy, eggs, soy products, and quinoa
- Incomplete protein
  - Includes most plant foods
- Complementary proteins

Rice, corn, and beans all have at least one essential amino acid that is present in a lower amount than what is needed to support protein synthesis in the body. Because the essential amino acid that is low in both corn and rice is different from the one that is low in beans, combining beans with either corn or rice provides complete protein.

Iron found in plant-based foods is less bioavailable

- Heme iron is more bioavailable
  - Found in animal foods
- Nonheme iron
  - Vitamin C–rich foods enhance absorption
  - Recommended intake is 80% higher for vegetarians
  - Plant foods rich in iron
    - Soybeans, beans, legumes, dried fruit, spinach, fortified whole-grain cereals

Vegetarians typically consume enough zinc

- Less bioavailable in plant foods
- Emphasize zinc-rich foods
  - Soy products, legumes, grains, and nuts

Valentina Razumova/Shutterstock

Vegans may have inadequate intake of calcium, vitamin D, and riboflavin

- Dairy foods are significant source of each
- Calcium plant sources
  - Leafy greens, broccoli, fortified soy, rice, and almond milks or beverages
- Vitamin D plant sources
  - Fortified soy, rice, almond milks, or fortified foods
- Riboflavin plant sources
  - Almonds, mushrooms, and spinach

Vitamin B_{12} is found naturally only in foods of animal origin

Vegans must obtain it from:

- Fortified foods
- Fortified nutritional yeasts
- B_{12} supplements

Susan Gottberg/Alamy

Avoiding or restricting seafood and fish may result in low intake of iodine and omega-3 fatty acids

- Iodine is also found in iodized salt
- Omega-3 fatty acids are found in some non-animal sources
  - Some fortified foods provide EPA and DHA
  - Small amount of plant-based ALA (alpha-linolenic acid) is converted to EPA and DHA
    - Found in walnuts, flaxseeds, soy, and algae

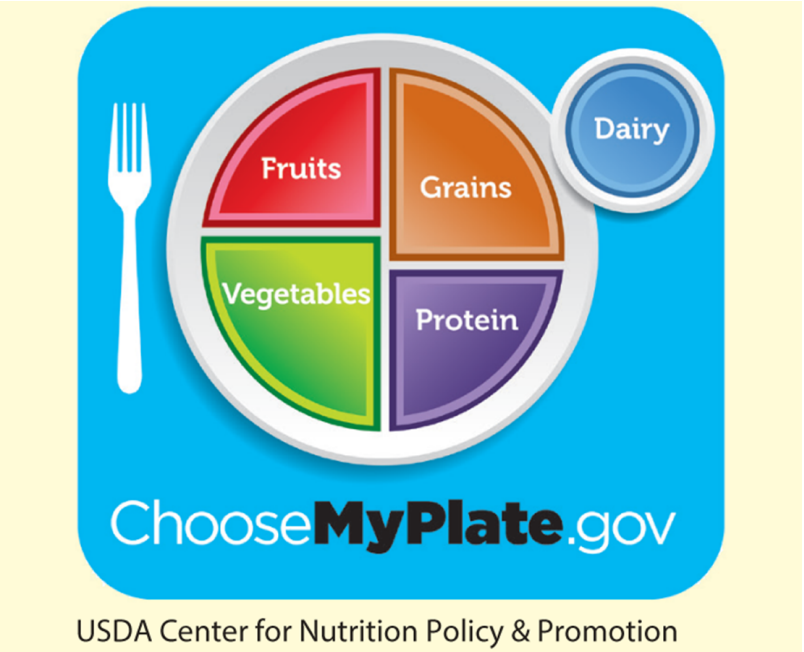
Image: https://www.shape.com/healthy-eating/diet-tips/vegetarian-foods-offer-healthy-dose-omega-3-fatty-acids

Academy of Nutrition and Dietetics recommendations for vegetarians

- Choose a variety of foods
  - Whole grains, vegetables, legumes, nuts, seeds, and, if desired, low-fat dairy products and eggs in moderation
- Minimize intake of highly sweetened, fatty, and heavily refined foods
- Strict vegans may need supplements or fortified foods to get adequate nutrients, especially vitamin B12 and vitamin D
- Consult with a health provider or registered dietitian nutritionist for dietary planning and advice on dietary supplement needs

Helpful resources for planning vegetarian diets

- USDA's www.ChooseMyPlate.gov
- Fill the protein portion of the plate with plant sources of protein
  - Beans, peas, lentils, soy, seeds, and nuts



USDA Center for Nutrition Policy & Promotion

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10 tips: healthy eating for vegetarians

1. Think about protein
2. Bone up on sources of calcium
3. Make simple changes
4. Enjoy a cookout (meat alternatives)
5. Include beans and peas
6. Try different veggie versions
7. Make small changes at restaurants
8. Nuts make great snacks
9. Get your vitamin B12
10. Find a vegetarian pattern for you

mama_mia/Shutterstock

http://www.choosemyplate.gov/healthy-eating-tips/tips-for-vegetarian.html

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Due to their increased nutrient needs, vegetarian children and adolescents may be more at risk for nutritional deficiencies

- Higher-nutrient needs to support growth and development
- Vegan children tend to be slightly smaller than children on a lacto-ovo vegetarian diet or non-vegetarian diet
- Poor growth when deficient in protein, calories, or other nutrients such as iron and zinc
- When adequate, health benefits of plant-based diets can reduce risk of obesity and chronic disease later in life
- Tend to consume more fiber, folate, and vitamins A and C
- Tend to consume fewer sweets, fast foods, and salty snacks

The traditional Mediterranean diet is rich in vegetables, fruits, fish, nuts, and olive oil

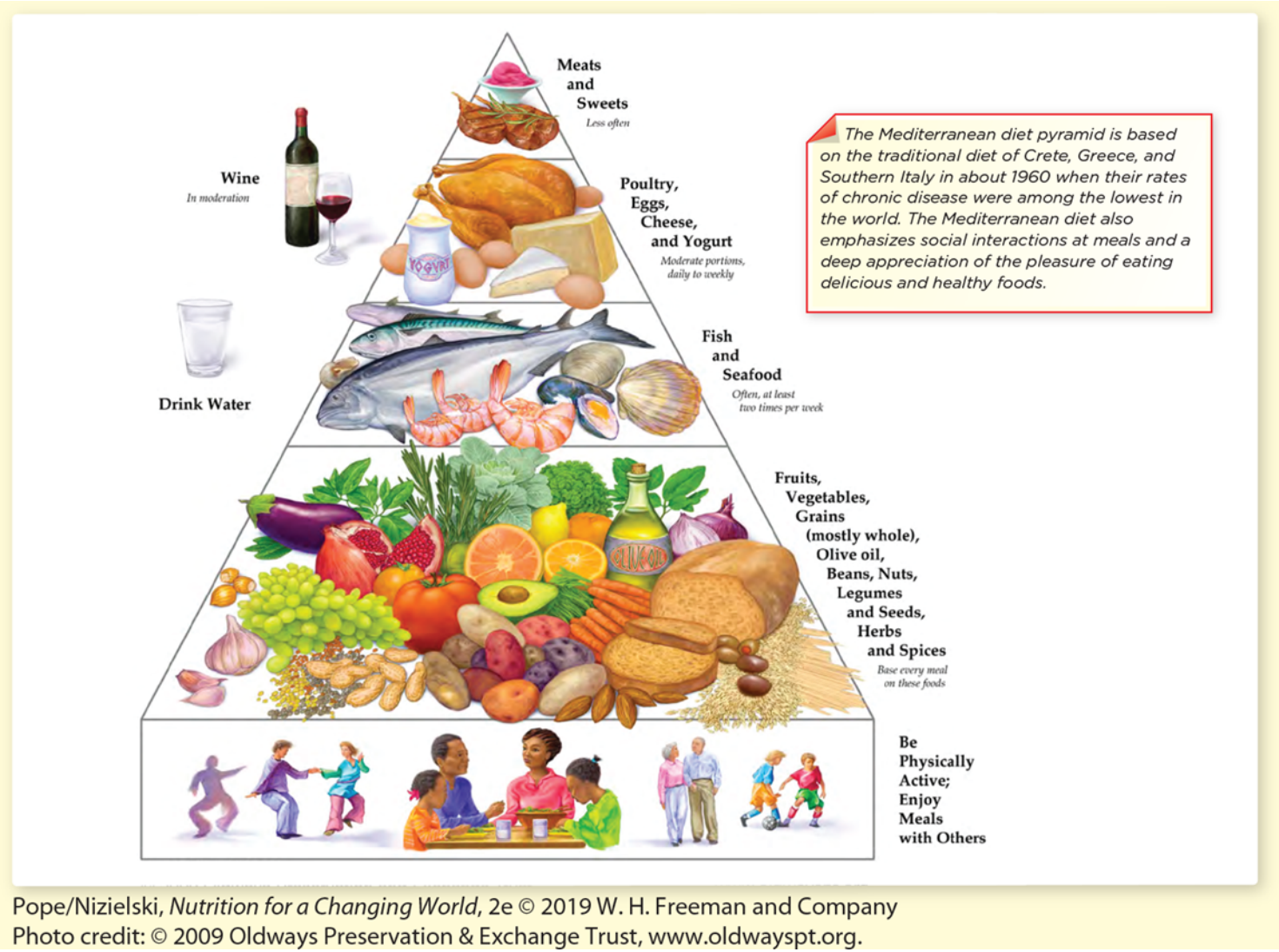

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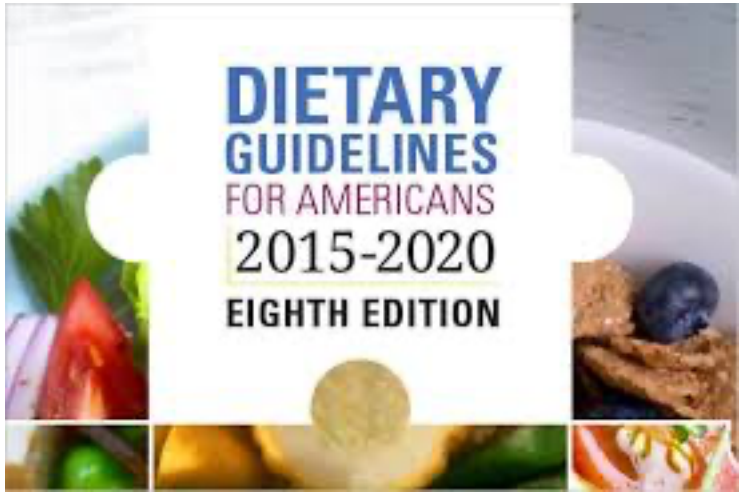
Photo credit: © 2009 Oldways Preservation & Exchange Trust, www.oldwayspt.org.

The traditional Mediterranean diet has health benefits

- High in monounsaturated fats
- Healthy ratio of omega-6 to omega-3 fats
- High in fiber, antioxidants, and polyphenols
- Moderate consumption of wine with food
- Consumption of fish and less other meat
- Lower incidence of heart disease, diabetes, Parkinson disease, allergies in children, cancer, and maybe Alzheimer disease
- Lifestyle characteristics also play a role

The 2015 Dietary Guidelines for Americans include a Healthy Mediterranean-Style Eating Pattern

- Designed "to more closely reflect eating patterns that have been associated with positive health outcomes in studies of Mediterranean-Style diets"
  - Contains more fruits and seafood and less dairy than the U.S.-style diet, and, with the exception of calcium and vitamin D, has similar nutrient content
  - “The healthfulness of the Pattern was evaluated based on its similarity to food group intakes reported for groups with positive health outcomes in studies rather than on meeting specified nutrient standards“



http://health.gov/dietaryguidelines/2015/guidelines/chapter-1/examples-of-other-healthy-eating-patterns/

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Whole-food plant-based diets may be more sustainable than diets rich in animal foods

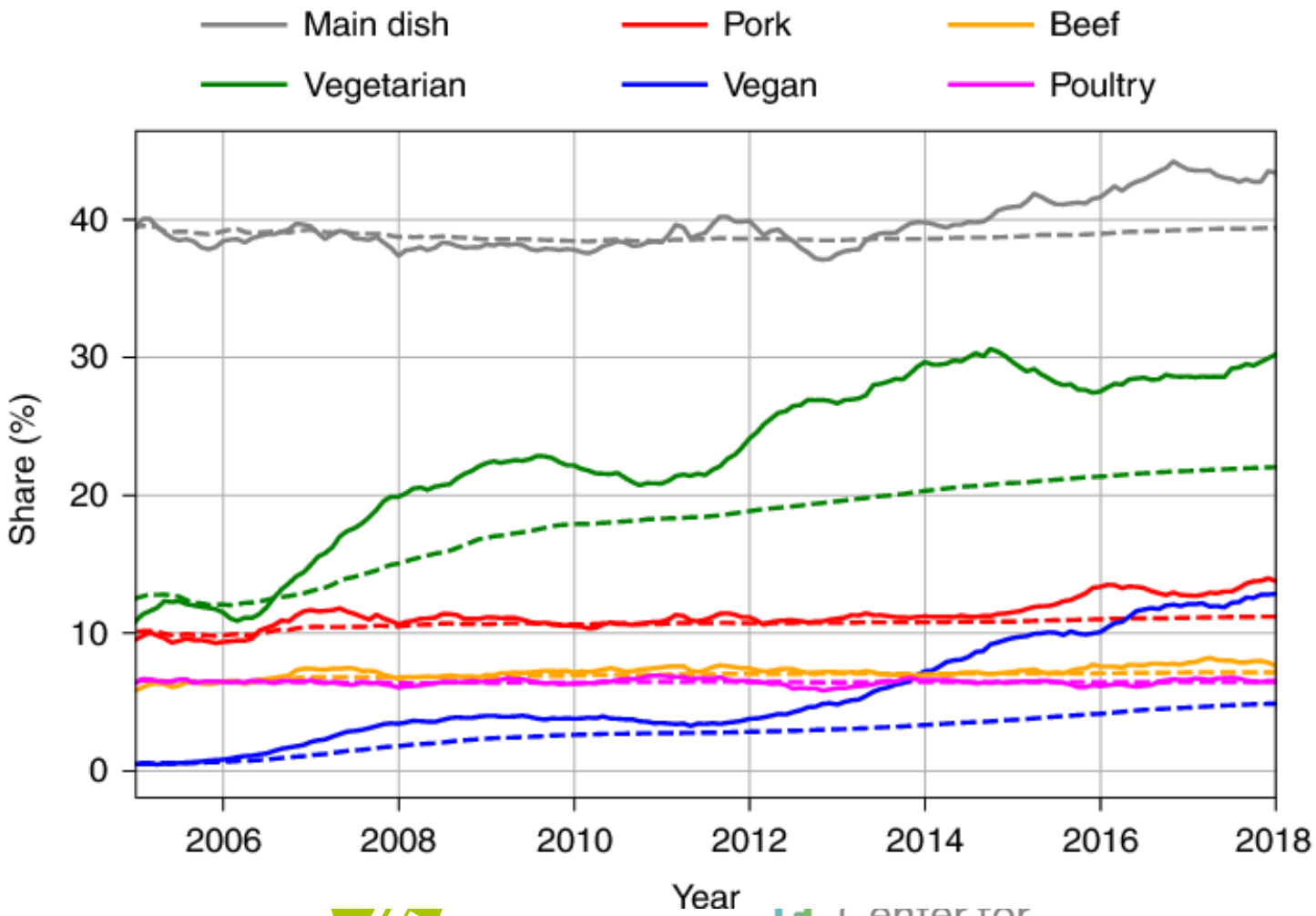
- Sustainability
  - The ability to meet our current needs without compromising the ability of future generations to meet their needs
- Mounting evidence that shifting to plant-based diets reduces the environmental impact of food production
- Population switch to Mediterranean-style diet
  - Reduces greenhouse gas emissions
  - Reduces energy and water use
  - Decreases agricultural land use

Adopting a Vegetarian Eating Pattern

- According to a 2018 Gallup poll, 5% of U.S. adults consider themselves to be vegetarian.
- Nonwhite Americans (9%) are three times as likely as white Americans (3%) to describe themselves as vegetarian.
- Vegetarianism is less prevalent among older Americans: 2% of adults aged 55 and older say the adhere to a vegetarian diet, compared with 8% of 18- to 34-year-olds and 7% of 35- to 54-year-olds.
- Over 90% of self-identified vegetarians consumed dairy products on the day of the NHANES survey, and 65% of them consumed eggs.
- Dairy and egg quantities consumed did not differ significantly between self-identified vegetarians and non-vegetarians.

https://news.gallup.com/poll/267074/percentage-americans-vegetarian.aspx; https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/advisory-report/appendix-e-3/appendix-37

Rising adoption and retention of meat-free diets in online recipe data



Asano, Y.M., Biermann, G. Rising adoption and retention of meat-free diets in online recipe data. *Nat Sustain* **2,** 621–627 (2019). https://doi.org/10.1038/s41893-019-0316-0

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Developing Mediterranean-Style and Vegetarian Eating Patterns

Table 2. Reported food group intake by populations with positive health outcomes, from studies using Med-Diet indexes to assess intake, in comparison to amounts in USDA Food Pattern, in grams per 1000 calories.

Food groups and subgroups	Range of intakes across studies	Median intake in studies	Amounts in USDA Food Pattern
	g/1000 kcal	g/1000 kcal	g/1000 kcal
Vegetables (incl. legumes)	121-195	161	156-174
Fruits	88-185	156	96-125
Grains/ cereals	20-135	80	89-101
Red/processed meat	41-89	56	25-28
Fish and seafood	22-49	32	16-20
Total dairy	99-214	152	194-258
Oils	10-24	12	13-14

Links

https://health.gov/sites/default/files/2019-09/Appendix-E-3.7.pdf

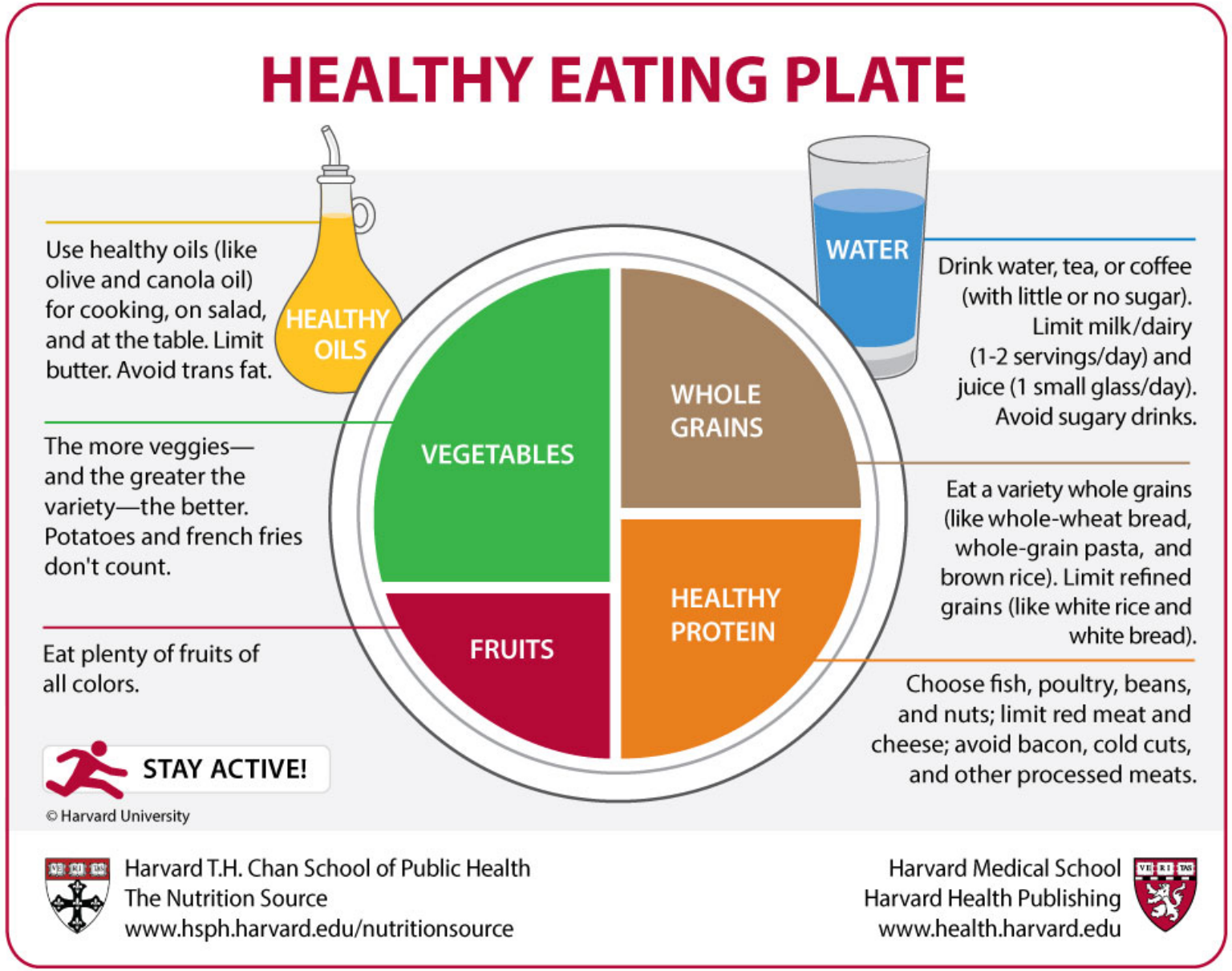
https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/advisory-report/appendix-e-3/appendix-e-37

Getting Started

Source: https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/vegetarian-diet/art-20046446

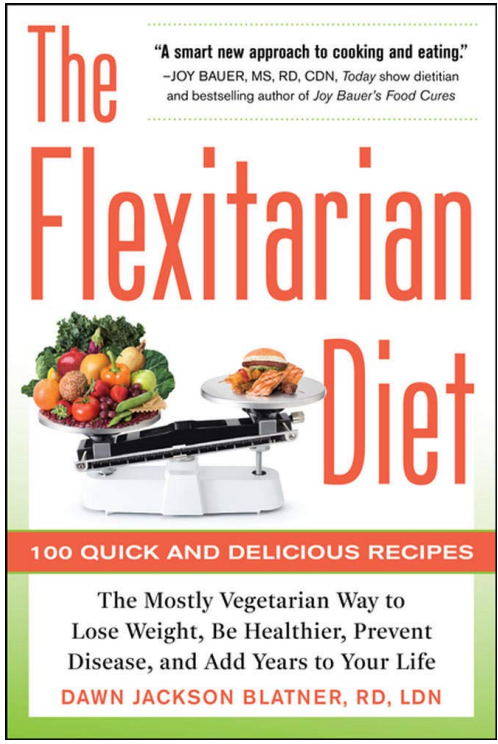
- One way to transition to a vegetarian diet is to gradually reduce the meat in your diet while increasing fruits and vegetables. Here are a couple of tips to help you get started:
- **Ramp up.** Each week increase the number of meatless meals you already enjoy, such as spaghetti with tomato sauce or vegetable stir-fry. Find ways to include greens, such as spinach, kale, Swiss chard and collards, in your daily meals.
- **Substitute.** Take favorite recipes and try them without meat. For example, make vegetarian chili by leaving out the ground beef and adding an extra can of black beans. Or make fajitas using extra-firm tofu rather than chicken. You may be surprised to find that many dishes require only simple substitutions.
- **Branch out.** Check the internet for vegetarian menus. Buy or borrow vegetarian cookbooks. Check out ethnic restaurants to sample new vegetarian cuisines. The more variety you bring to your vegetarian diet, the more likely you'll be to meet all your nutritional needs.

The Look of a Plant-Based Meal



Still want to eat meat? Try the Flexitarian approach.

- Flexitarians ("flexible vegetarians") eat a lot less meat than they used to but don't give it up completely.
  - book by Dawn Jackson Blatner, RD
- The Flexitarian Diet has no clear-cut rules or recommended numbers of calories and macronutrients. In fact, it's more a lifestyle than a diet.
- It's based on the following principles:
- Eat mostly fruits, vegetables, legumes and whole grains.
- Focus on protein from plants instead of animals.
- Be flexible and incorporate meat and animal products from time to time.
- Eat the least processed, most natural form of foods.
- Limit added sugar and sweets.



Summary

- Different types of vegetarian diets.

Image: https://wp.nyu.edu/dispatch/2019/10/08/fruit-and-vegetables-as-key-dietary-contributors/

- Identify challenges that vegetarians may experience in meeting their requirements for specific nutrients, and provide strategies to alleviate these concerns
- Describe the rationale for protein complementation, and give two examples of complementary protein foods
- Compare and contrast the dietary recommendations and potential benefits of a vegetarian and Mediterranean diet